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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,765	12/01/2006	Jin-Xing Li	WSAG0107PUSA	4667
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BROOKS KUSHMAN P.C. 1000 TOWN CENTER TWENTY-SECOND FLOOR SOUTHFIELD, MI 48075				
EXAMINER				
LANGMAN, JONATHAN C				
ART UNIT		PAPER NUMBER		
1784				
MAIL DATE		DELIVERY MODE		
11/23/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/528,765

Applicant(s)

LI ET AL.

Examiner

JONATHAN C. LANGMAN

Art Unit

1784

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 47-67 is/are pending in the application.
- 4a) Of the above claim(s) 47-63, 66 and 67 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 64 and 65 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 22, 2010 has been entered.

Election/Restrictions

Newly submitted claims 66 and 67, referred to herein as "group II", are directed to an invention that is independent or distinct from the invention originally claimed in claims 64 and 65, referred to herein as "group I", for the following reasons:

The inventions listed as Groups *** do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

- (1) The special technical feature for each group is not commonly shared.

In particular, the special technical feature of Group I is A two layer oxide backside seal. The special technical feature of Group II is a single layer oxide. Therefore, the inventions or groups of inventions lack unity.

- (2) Furthermore the common feature of an oxide layer on the backside of a silicon wafer with an epitaxial layer formed on the front side as set forth in group II, cannot qualify

as a special technical feature as it does not provide a contribution over the prior art because it is disclosed by Takimazawa et al. (US 5,998,283 (previously cited)).

In particular, Takimazawa et al. teaches a silicon wafer 3, with an oxide backside seal, and an epitaxial layer 3 formed on the front side and further indicates the substrate is p or n-type (col. 6, lines 50-57), and col. 5, lines 63, and Figure 2). Therefore, the reference(s) specifically suggests using the common elements as claimed.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 66 and 67 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 64 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Barth et al. (US 2002/0076917).

Barth et al. teach a substrate, with an undoped LTO PECVD formed layer with a stress of $0.8E^9$ dynes/cm² (which converts to 80 MPa). Upon which is deposited a doped LTO PECVD layer with a stress of $1.5E^9$ dynes/cm² (which converts to 150 MPa) (see at least abstract and [0027]).

These two layer oxide films satisfy the instantly claimed two layer LTO backside seal. Wherein the first LTO layer has a stress of less than 100 MPa, the second LTO layer has a stress of less than 300 MPa, and the stress of the second LTO layer is greater than the stress of the first LTO layer.

The two layers of Barth have the same stress and structural claim limitations as instantly claimed. Therefore the two layer LTO stack of Barth is said to possess the descriptive and/or functional claim language of "backside seal".

The instant claim limitation of "wafer substrate" is merely a descriptive term that sets out no structural limitations for the substrate. Therefore little to no patentable weight is given to the term "wafer", in as much as the substrate of Barth anticipates the instantly claimed substrate.

Barth is silent to the PECVD coatings to be "LP" i.e. "Low pressure". However this is process a limitation that will not result in a structural difference between the claimed product and PECVD formed structure of Barth. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious

difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113). Since, as set forth above, Barth teaches the same structure as instantly claimed, little to no patentable weight is given to the process claim language of "low pressure" as this is a process limitation that will not result in a structural difference between the claimed structure and that taught by Barth.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barth et al. (US 2002/0076917) as applied to claim 64 above, in view of Chen (US 6,440,840).

Barth et al., as described above, teach a substrate, upon which is deposited an insulator of two LTO layers possessing the instantly claimed film stresses. Barth teach that this dual layer is capable of forming metallization of copper in a dual damascene process thereon ([0006]-[0007] and [0028]).

Barth et al. is silent to the substrate, specifically the substrate being a wafer substrate with a polysilicon layer located between the first insulating layer and the substrate, as set forth in instant claim 65. However it would have been obvious to utilize

any known substrate in the art, especially a substrate utilized for the damascene processing of copper on FSG insulating layers.

Chen et al. teach a structure which comprises a wafer substrate (see at least Chen, col. 2, lines 49-50, and claim 1) (not shown) upon which is formed an electrical conducting layer, 10, such as polysilicon (Chen, claim 2). Upon the substrate is deposited a barrier layer, 12, of silicon nitride, and an FSG layer, 14, before metallization occurs (col. 3, line 60 to col. 4, line 18). This structure is similar to that structure of Barth et al.

It would have been obvious to utilize the wafer substrate of Chen comprising the polysilicon layer, as the substrate of Barth, as these are used in the same art of forming dual damascene copper metallization.

Response to Arguments

Applicant amended claims 66 and 67 to overcome the previously set forth 112 1st rejection, the amendment has overcome the rejection, however, the amendment now provides two distinct inventions, the intermediate structure, which comprises two oxide layers, and a final product which only comprises a single oxide layer, these two inventions do not share a special technical feature, and for reasons mentions above, do not provide a contribution over the prior art.

On page 7 of the remarks submitted October 22, 2010, applicant argues that Barth clearly does not disclose a layer structure which is a backside seal of a wafer

substrate as required by independent claim 1, and that the layers of Barth are not suitable to seal the backside of the wafer.

The applicant has not defined "backside seal", to mean anything other than two LTO layers formed on a substrate as is shown in the specification and in the claims. Barth et al. teach the same structure of two oxide layers formed on a substrate, and although they might not refer to these layers as a backside seal, the structure of Barth and the instant claims is the same, and therefore little patentable weight is given to the functional language of "backside seal".

It is the examiner's position that the descriptive term "backside seal" in the present claims does not result in a structural difference between the presently claimed invention and the prior art and further that the prior art structure is capable of performing the intended function. Given that Barth et al. discloses a two layer oxide system on a wafer substrate as presently claimed, it is clear that the article of Barth would be capable of behaving as a backside seal, presently claimed as required in the above cited portion of the MPEP.

Applicant argues on page 8, that both the first and second layers in Barth et al. are low stress layers, and that the claims are to a high and low stress layer. "Low" and "High" as claimed are relative terms used to describe the level of stress within the oxide layers. The claims set forth that the first low stress LTO oxide layer has a stress of less than 100 MPa. Barth et al. teach that the first layer has a stress of 80 MPa, (lower than 100 MPa) and therefore is a "low stress" LTO oxide in the same context as claimed.

The claims set forth that the second high stress LTO oxide layer has a stress of less than 300 MPa. Barth et al. teach that the second LTO oxide layer has a stress of 140 MPa, (lower than 300 MPa), and therefore is a "high" stress LTO oxide in the same context as claimed.

Even though Barth refers to the layer with a stress of 140 MPa, as a low stress layer, this is merely a descriptive term, and since the stresses fall within the claimed stresses, they are said to read on the claimed "high stress" layer, as their stress falls within the range of the claimed high stress layer, and the layer has a higher stress than the first deposited LTO layer.

On page 8 applicant further argues that the second layer (FSG layer) in Barth et al. is not a mere oxide layer but a doped oxide layer. It appears that the applicant is arguing that the doped layer of the prior art is somehow distinguishable from the claimed LTO. However, the doped oxide of Barth is none the less a Low temperature oxide, and the claims do not limit the oxide layer to any specific material, the claims only limit the layer to be a low temperature deposited oxide. Since Barth teaches a low temperature oxide, it is said to read on the claim as presented. The claim uses open ended claim language i.e. "comprising", and therefore is open to other components to be present therein, such as the dopants taught by Barth et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN C. LANGMAN whose telephone number is

(571)272-4811. The examiner can normally be reached on Mon-Thurs 8:00 am - 6:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCL
/Jonathan C Langman/
Examiner, Art Unit 1784